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Sampling Your Drinking Water

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Safe drinking water is important to your health. But how can you tell if your well and water system provide safe water? The answers are to periodically inspect the water system for defects and have a water sample tested for harmful contaminants by a laboratory,

Operators of public water systems watch constantly for defects that could allow contaminants to enter. Any water samples are analyzed frequently to ensure that federal drinking water standards for public water systems are met. Many Iowans, however, get their drinking water from private water systems. **If your drinking water comes from a private water supply, it's up to you to make sure the system is properly inspected and tested for safety.**

If you're thinking about having your drinking water tested, there are some important questions you will need to consider. What should you test your water for? When is the best time to test? How do you collect a good water sample that accurately reflects the quality of water coming from your well? Which laboratory should you use? What other precautions can you take to help ensure a safe water supply?

What to Test For

Unfortunately, there is no single test that tells you if water is safe to drink. There are many waterborne contaminants that can be health-related if present in sufficient concentrations. These include biological contaminants such as bacteria or viruses; inorganic chemicals such as lead, nitrate, or sulfate; and organic chemicals such as insecticides, herbicides, fuel, and solvents.

Since there are many potential water contaminants, it would be very costly—and in most cases unnecessary—to test for them all. Unless a specific contamination problem is suspected (as in the case of a chemical spill or other nearby source of contamination), private well owners often rely on tests for coliform bacteria and nitrate as general indicators of the safety of their drinking water. These contaminants are the most commonly reported causes of drinking water safety problems in private water systems throughout Iowa. Of nearly 10,000 private water samples submitted annually to the University Hygienic Laboratory, nearly 40 percent have unacceptable levels of coliform bacteria and 15 to 20 percent exceed recommended standards for nitrate. **It is recommended that every private well be tested for coliform bacteria and nitrate at least once each year.**

If manmade chemicals or other special contaminants are suspected, consult your county sanitarian, the University Hygienic Laboratory, the Iowa Department of Public Health, or the Iowa Department of Natural Resources about particular water tests that may be helpful.

When to Test

Some contaminants may be present during only part of the year. If you collect a water sample at a time when they are not likely to be present, you probably won't find them. To assess the year-round safety of your drinking water, you must collect the sample when contaminants are most likely to be present.

Coliform bacteria and nitrate are most likely to be found during wet weather, when runoff and excess soil moisture carry contaminants into shallow groundwater sources or through defects in your well. Late spring and early summer are good times to test for bacteria and nitrate.

Pesticides used on the lawn, garden, or farm fields are likely to be present in greatest concentrations (if at all) soon after they are applied. With time, these chemicals tend to break down, reducing the amount of chemical that can migrate into the groundwater. With the exception of large chemical spills, it takes excess soil moisture to carry pesticides into the

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ground. So once again, late spring and early summer are good times to test for pesticides if they are of concern to you.

The poorest times to test water quality are during extremely dry weather or when the ground is frozen. In either case, lack of moisture migration through the soil profile reduces the likelihood of finding high contaminant levels in wells. So a "safe" test result during winter (or a very dry season) provides no guarantee that contaminants won't be present during wet weather.

Where to sample

The best location to collect a drinking water sample is at the tap you drink from most frequently. If contaminants are found, you will need to inspect your water system for defects and, if necessary, collect additional samples at other locations to determine if the impurities are entering at the well or through defects in the plumbing system.

Special care must be taken when sampling for bacterial contaminants. Bacteria are commonly carried on dust or dirt particles. So avoid drawing a sample for bacterial tests in extremely dirty locations where dust could accidentally enter the sterile sample container. Clean *indoor* locations are best. If an outdoor sampling location must be used, avoid drawing bacterial samples from frost-proof hydrants. The buried valve that allows them to drain and avoid freezing can also allow bacterial contaminated water to be drawn into the riser pipe leading to the hydrant.

Collecting the Sample

To get accurate water quality test results, you will need to take some precautions when collecting the samples. Contact the laboratory for the appropriate sample container. Some tests, such as the one for coliform bacteria, require that the sample be collected in a sterile container. Some other tests require special preservatives in the sample container. Most laboratories will supply appropriately prepared containers of suitable size when you tell them which contaminants you wish to test for.

Always take time to read the sampling instructions provided by the laboratory. **The general sampling instructions that follow are suitable for coliform and nitrate tests.** Lead, pesticides, and other contaminants may require special sample collection procedures.

To obtain water samples from your well, you will need to flush the water line leading to the tap. Since dirt and bacteria can accumulate in aerator screens, remove these before flushing the line. Then open the tap to full flow and let it run until water arrives from the well. A reduction in water temperature usually signals that water is arriving from the well. Next, reduce the flow to a pencil-sized stream. Open the sample container, fill it to within one-half inch of the top, and replace the cap *immediately*. Do *not* rinse the sample container.

If the sample will be analyzed for coliform bacteria, take care to avoid contaminating the sample as you fill the container. Bacteria on your hands or on dust particles in the air can affect test results. Do not allow the interior of the bottle, its rim, or the inside of the cap to come into contact with anything other than the water itself. Close the sample container as soon as an adequate amount of water has been placed in it.

Once the sample is collected get it to the laboratory as soon as possible. To ensure accurate results, many tests require that the sample be received at the laboratory within a certain time period. **Coliform bacteria samples, for example, must be received within 48 hours after sample collection.** Longer holding times can permit changes in the bacterial concentration to occur. This may lead to incorrect conclusions about your water quality.

If the sample cannot be mailed or transported immediately, refrigerate it (do not freeze) and get it to the lab as soon as possible. Avoid mailing samples during weekends or holidays, as delivery may be delayed during these periods.

If you have difficulty getting water samples to the laboratory by mail within 48 hours, check with your local post office for advice on the best time to mail parcels. If that doesn't help, you may need to contact a carrier service that specializes in rapid parcel delivery.

Before mailing your sample, but sure to fill out the sample submission form provided by the lab. Your name, address, and the date and time of sample collection are required.

Selecting a Laboratory

Accurate laboratory results are no accident. They are obtained when highly trained personnel follow standard testing procedures approved by federal and state environment and health agencies. In Iowa, laboratories that perform water analysis for public water supplies must be certified by the Iowa Department of Natural Resources. Certification helps ensure that public water supply testing is accurate. You can benefit from laboratory certification too. Before selecting a lab, simply inquire if it is state-certified to test public water supplies for the contaminants you wish to test for.

Other Safety Precautions

Laboratory analysis of water samples is one way to help assure a safe private water supply. But water testing, by itself, provides only part of the picture on the condition of your water system.

A water test simply provides a "snapshot" of what the water quality was like at the time the sample was collected. As noted earlier, water samples drawn from a defective well during periods of dry weather or frozen soil conditions may test "safe" even though the same well tests unsafe during periods of warm and wet weather.

To get a more complete picture of the potential for water system contamination, it is important to combine periodic water testing with careful water system inspection. Loose or missing well caps, holes or cracks in the upper part of well casings, unusually low water pressure (less than 20 pounds per square inch with two fixtures running), or stagnant water ponded near a well, are just a few of the problems that can lead to contamination. For assistance in identifying and repairing water system defects, contact a qualified public health sanitarian, well driller, or plumber.

For Further Information

For more information on wells and water quality, ask at your Iowa State University county extension office for these Iowa State University publications:

- PM 1329 ***Coping With Contaminated Wells***
- PM 840 ***Good Wells for Safe Water***
- PM 1328 ***Plugging Abandoned Wells***

You also can check on the publications Web site: www.extension.iastate.edu/store/.

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